Geographic Information Systems

WHAT IS THE PUBLIC HEALTH ISSUE?

- About 40,000 hazardous-waste sites have been reported to the federal government. Additionally, thousands of inadvertent environmental releases of toxins occur each year.
- More than 1,600 hazardous waste sites are included on the National Priorities List (NPL) and are targeted for clean up by the Environmental Protection Agency. About 15 million people live within 1 mile of NPL sites.
- There is a critical need to correlate the proximity of people to the geographic location of environmental hazards.

WHAT HAS ATSDR ACCOMPLISHED?

A geographic information system (GIS) is a computer-based system that allows the layering of health, demographic, environmental, imagery, and other traditional data sources to be analyzed by their location on the earth's surface. ATSDR has developed a state-of-the-art GIS to characterize environmental conditions and community characteristics (demographics) near Superfund hazardous waste sites for use by scientists to assess the potential for exposure to toxic substances and mitigate adverse health outcomes from those exposures. ATSDR's Public Health Geospatial Research, Analysis, & Services Program is on the forefront of the use of spatial analysis tools for public health applications. Other activities include demographic analyses, medical geography, exposure assessment and contaminant modeling. Scientists in the program use US Census data, health outcome data, and contaminant data collected by State and Federal agencies and their contractors to address public health related issues related to potential exposure to hazardous substances in the environment. In addition, field personnel collect spatial data at sites using global positioning system (GPS) technology for integration within the GIS.
Presently, the program is comprised of three interconnected functional areas that are best-suited to meet the evolving needs of agency customers: Rapid Response and Emergency Preparedness Support (RREPS), Geospatial Informatics, Systems, & Applications (GISA), and Geospatial Services, Training, and Applied Research (GeoSTAR). The separation into three focused areas is more conceptual than real in that there is a great deal of staff overlap. The skills, talents, and experience of individuals across these areas are utilized co-dependently when carrying through on any number of tasks. The responsibilities of each respective area overlap significantly; the Public Health GRASP rests firmly on the tenets of collaboration and cooperation. For example, each area draws heavily upon the geospatial data store managed by the GIS Systems and Applications Consultation and Integration Unit. Additionally, concepts developed during the response to a crisis by RREPS and GEOSTAR, may often be fully developed and automated, as in the case of an algorithm or cartographic product, by staff in the GEOSTAR and GISA areas.

WHAT ARE THE NEXT STEPS?

The program is moving away from the strict identification with the software that is the primary tool used (GIS) towards identifying more with the underlying principles of geography and spatial analysis which form the basis of our analytic services. Hence the program is more accurately defined as the Public Health Geospatial Research, Analysis, & Services Program (Public Health GRASP).

ATSDR is expanding the field applications for public health emergency preparedness and response. The agency is continuing to develop Internet-based applications linking public health professionals to large data warehouses for public health research and planning. Through collaborations with other federal, state, and local agencies, ATSDR is working to build the capacity for use of this tool in public health applications at all levels.